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ENTOMOLOGICAL NEWS

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Studies in Panama Culicoides (Diptera, Heleidae). III. A New Species Related to phlebotomus (Williston) [1]

By WILLIS W. WIRTH [2] and FRANKLIN S. BLANTON [3]

Twelve new species of *Culicoides* have been described in two previous papers (Jour. Wash. Acad. Sci.; Jour. Parasit., in press) of this series, which is based primarily on material collected by the junior author in Panama. In this paper we wish to clarify the status of an important pest at Caribbean seaside resorts, *Culicoides phlebotomus* (Williston), and to describe a new species closely allied to it from Panama.

We are greatly indebted to Paul Freeman, of the British Museum, for generously making available paratypes of *Culicoides amazonius* Macfie and for critical comparisons of our specimens with the type of *Ceratopogon phlebotomus* Williston; to John Lane and O. P. Forattini, of the University of São Paulo, Brazil, for critical notes and for the gift of Brazilian specimens; to Irving Fox, of the University of Puerto Rico, for Puerto Rican material and for valuable advice and suggestions; and to Paul Woke, of the U. S. Public Health Service, for the gift of specimens. Unless otherwise noted, all material studied is in the collection of the U. S. National Museum, Washington, D. C.

[1] Published under the auspices of the Surgeon General, U. S. Army, who does not necessarily assume responsibility for the professional opinions expressed by the authors.

[2] Entomologist, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.

[3] Lieutenant Colonel, MSC, U. S. Army Caribbean, Fort Clayton, Canal Zone.

Culicoides phlebotomus (Williston) (figures 1, 2)

Ceratopogon phlebotomus Williston, 1896, Trans. Ent. Soc. London 3: 281 (♀; St. Vincent Island, British West Indies).

Culicoides phlebotomus, Hoffman, 1925, Amer. Jour. Hyg. 5: 285 (female redescr.; Puerto Rico; figure of wing); Painter, 1926, United Fruit Co. Med. Rept. 15: 258 (Honduras; biology); Fox, 1942, Puerto Rico Jour. Publ. Hlth. & Trop. Med. 17: 419 (pupa; Virgin Islands); Fox, 1946, Ann. Ent. Soc. Amer. 39: 252 (St. Croix); Barbosa, 1947, An. Soc. Biol. Pernambuco 7: 24 (Trinidad).

Culicoides amazonius Macfie, 1935, Stylops 4: 52 (male, female; Tutóia, Brazil; male genitalia figured); Macfie, 1927, Ann. Mag. Nat. Hist. (10)20: 6 (Trinidad); Costa Lima, 1937, Mem. Inst. Oswaldo Cruz 32: 414 (Pará, Brazil); Floch and Abonnenc, 1942, Inst. Pasteur Guyane Inini Publ. 37: 3 (Cayenne, Fr. Guiana; figure of female wing, palpus); Barbosa, 1947, An. Soc. Biol. Pernambuco 7: 11 (Pernambuco, Brazil). NEW SYNONYMY.

Material examined:

PUERTO RICO: Fort Buchanan, May, 1951, I. Fox (light trap), 1 female. Guanica, June 22, 1952, F. S. Blanton (light trap), 14 females.

MEXICO: Salina Cruz, Oaxaca, F. Knab, 1 female.

HONDURAS: Puerto Castilla, Sept. 21, 1943, K. R. Maxwell (horse trap), 12 females.

NICARAGUA: Corinto, Jan. 17–23, 1943, P. A. Woke (biting man and at light), 8 males, 27 females.

PANAMA: Arraijan, Panama Prov., May 21, 1951, F. S. Blanton (light trap), 9 males, 70 females. Mojinga Swamp, Fort Sherman, Canal Zone, Nov. 14, Dec. 10, 1951, F. S. Blanton (light trap), 2 females. Rio Hato, Coclé Prov., Sept. 24, 1951, F. S. Blanton (light trap), 1 female. Palm Beach near San Carlos, Panama Prov., Sept. 17, 1952, F. S. Blanton (light trap), 7 females.

VENEZUELA: Puerto Cabello, Carabobo, Nov. 12, 1951, L. W. Teller (biting man at beach), 1 female.

BRAZIL: Tutóia, Maranhao, 1934, E. M. Lourie, 2 females [British Museum; paratypes of *amazonius;* one deposited in the U. S. National Museum through the courtesy of the British Museum]. Conceicao Beach, Pernambuco, April, 1944, F. Barbosa, 1 male. Caponga, M. Cascavel, Ceará, Nov., 1939, 2 females.

As a result of the descriptions by Hoffman (1925) and Macfie (1935), this species has been well characterized. Indeed, it is puzzling that Macfie, having access to Williston's type of *phlebotomus* at London, and mentioning that species in his description of *amazonius,* but without giving characters for their separation, could have been misled into describing the Brazilian material as new. Probably the fact that he had no male specimens from any known localities for *phlebotomus,* together with the southern distribution of his specimens, prompted him to go ahead. In the recent keys to Neotropical *Culicoides,* these two species are separated only by the cordiform fourth tarsal segment of *amazonius,* which *phlebotomus* is said to lack (Costa Lima, 1937; Barbosa, 1947; Macfie, 1948). Therefore a careful study was made of the material listed above, especially that from Puerto Rico and Venezuela, localities which are adjacent to St. Vincent and at which *phlebotomus* should most likely occur. All specimens were found to have the fourth tarsal segment cordiform, of the same shape as the paratypes of *amazonius* from Brazil (also as in figure 3, of *willistoni* n. sp.). Mr. Paul Freeman informs us that the same is true of Williston's type of *phlebotomus* in the British Museum. The only difference which could be found between the three Brazilian lots and those from farther north were that in the former the wings were not so strongly infuscated, the wing being mostly yellowish proximad of the r-m crossvein, a character obviously not of specfic value. The wing of a female from Fort Buchanan, Puerto Rico (fig. 1), shows the more conspicuous extreme of markings. One of the Tutóia paratypes was found to have three, subequal, almost spherical, and rather small, spermathecae, although all the rest of the specimens examined, including the other paratype, possessed the usual two oval, and rather large, spermathecae. No differences could be found in the genitalia, which are shown in figure 2. For these reasons *amazonius* is considered unquestionably a synonym of *phlebotomus.*

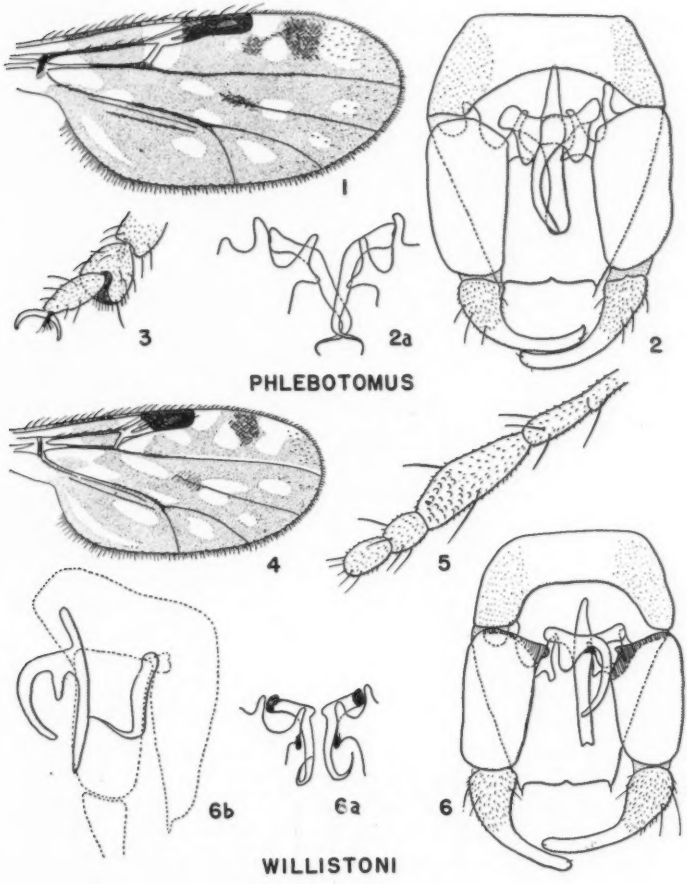
Culicoides willistoni Wirth and Blanton, new species (figures 3–6)

Female. Length 1.2 mm., wing 1.0 mm. by 0.5 mm..

Head black, the vertex grayish pruinose; eyes contiguous, bare. Antennae with flagellar segments in proportion of 15:12:12:12:12:12:12:12:18:18:20:20:35; distal sensory tufts present on segments 3–10. Palpal segments in proportion of 10:25:30:10:10; third segment slightly swollen, without pit, the sensoria scattered over mesal side of distal half of segment (fig. 5).

Mesonotum densely bluish-gray pruinose, with prominent pattern of scattered brown dots, each dot surrounding the base of one of the stout, brown, mesonotal hairs; the brown areas often confluent on middle of anterior margin and on sublateral areas between the suture and wing bases. Scutellum bluish-gray pruinose, dark brown in middle; with four long hairs. Postscutellum and pleura blackish with variable grayish pollinosity. Legs brown; bases of femora pale and well defined, narrow, subapical pale rings on femora and sub-basal rings on tibiae; apices of hind tibiae pale; tarsi pale; fourth tarsal segments cordiform (fig. 3).

Wing (fig. 4) with anterior radial cells very narrow, the second short; macrotrichiae confined to a few at wing tip in apices of cells R_5 and M_2. Wing deeply infuscated with brownish, a blackish stigmal spot over second radial cell and distal half of first; large yellowish areas at wing base and over r-m crossvein to slightly behind base of anterior media. Prominent bluish-white spots as follows: in cell R_5, a small, round spot behind second radial cell, a second spot just past apex of costa on anterior margin, a third just past this one in middle of cell R_5 and a fourth, hourglass-shaped spot halfway between the third and wing tip with the anterior portion broadly meeting wing margin. Vein M_1 narowly bordered on most of its length to apex with light gray; an elongate white spot straddling middle of vein M_2; an elongate white spot on mediocubitus near wing base; an elongate white spot in cell M_2 just behind anterior media before the fork; a smaller oval spot just ahead of mediocubital fork;



EXPLANATION OF FIGURES

Culicoides phlebotomus. Fig. 1. Female wing (Fort Buchanan, Puerto Rico). 2. Male genitalia, ventral view, parameres drawn separately in 2a (Arraijan, Panama).

Culicoides willistoni. Fig. 3. Distal tarsal segments of female, showing cordate fourth segment. 4. Female wings. 5. Female palpus. 6. Male genitalia, ventral view. 6a. Parameres drawn separately. 6b. Lateral view to show details of aedeagus and parameres.

small, rounded, white spots well back from wing margin in apices of cells M_1, M_2 and M_4; anal cell with an elongate white spot just behind mediocubital fork and a diffuse, narrow streak along wing margin in basal half of cell. Halteres white, the stems brownish.

Abdomen dark brown, narrow apices of tergites with pale gray margins. Spermathecae two, slightly oval to pear-shaped, subequal, the bases of the ducts sclerotized a very short distance; rudimentary third spermatheca and ring present as usual.

Male. Similar to the female but smaller, with the usual sexual differences; antennal plumes yellowish, longer than in *phlebotomus*. Genitalia (fig. 6): Ninth sternite with shallow, rounded mesal excavation; ninth tergite tapered, with very short apicolateral processes. Basistyles with ventral roots strongly constricted at bases, the apices broadly expanded, boathook-shaped; dorsal roots well developed, slender; dististyles strongly bent a third of way to apices, the latter more slender than in *phlebotomus*. Aedeagus with short, broad, transverse basal arms, a short, stout, pointed median process projecting anteriorly from between them; posterior margins of basal arms with short, platelike expansions; the aedeagus bearing posteriorly a straight, spatulate, distally truncated, dorsal blade, with a strong, ventrally curved process arising from the base with its distally pointed apex curving towards the dorsal blade and about two thirds as long. (In *phlebotomus* the ventral process is as long as the dorsal and is more strongly curved, with its apex often passing behind to the dorsal side of the broader, more spatulate, dorsal blade (fig. 2).) Parameres with bases abruptly bent and bearing strong knobs, each with a distinct triangular lobe on inner side at base of stem, then slightly narrowed and bent outward a short distance, then abruptly bent ventrad with slender, simple, pointed apex.

Holotype ♀, *allotype,* Rio Hato, Coclé Province, PANAMA, January 15, 1952, F. S. Blanton (light trap) (Type No. 61630, U.S.N.M.).

Paratypes: 27 ♂♂, 47 ♀♀, same data as type; 6 males, 20 females, Palm Beach near San Carlos, Panama Province, Panama,

September 17, 1952, F. S. Blanton (light trap); 2 ♂♂, 20 ♀♀, Puerto de Chorrera, Panama Province, Panama, September 9, 1952, F. S. Blanton (light trap).

This species is very closely related to *phlebotomus,* with very similar habitus, general color and type of wing markings, the same cordate fourth tarsal segments and palpal structure, and almost identical genitalia. In *phlebotomus,* however, the mesonotum is uniformly bluish-gray pruinose, without the punctiform brown dots, but occasionally with suffuse, yellowish brown sublateral bands; the legs are uniformly yellowish brown with the pale bands hardly distinguishable; the whitish wing markings are not so extensive, particularly in cell R_5 where the small round spot behind the second radial cell often disappears entirely and the third (see above) round spot usually lies directly behind the (second) one at the end of the costa, and there are differences as pointed out above in details of the male genitalia. Because of the punctiform mesonotal pattern and the similarity of the wing markings in cell R_5, *willistoni* can easily be confused with *furens* (Poey), which also occurs along Neotropical seacoasts. However, *furens* can be quickly separated by the yellowish color of the pale wing spots, it lacks the pale spot straddling the middle of vein M_2, the distal pale spot in cell M_1 extends narrowly to the wing margin and there are two pale spots distally in the anal cell. In *furens* there are also many structural characters different from those of the *phlebotomus* group.

We wish to dedicate this species to the memory of Samuel W. Williston, pioneer American dipterist, whose work on the Central American fauna remains as an American classic.

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Hoffman, W. A. 1925. A review of the species of *Culicoides* of North and Central America and the West Indies. Amer. Jour. Hyg. 5: 274–301, 2 plates.

MACFIE, J. W. S. 1935. Ceratopogonidae (Dipt.) from the River Amazon. Stylops 4: 49–56.
——. 1948. Some species of *Culicoides* (Diptera, Ceratopogonidae) from the State of Chiapas, Mexico. Ann. Trop. Med. Parasit. 42: 67–87.

The Identity of the Milliped Genus Camptomorpha Silvestri (Polydesmida: Chelodesmidae)

By RICHARD L. HOFFMAN, Blacksburg, Virginia

In the years between 1895 and 1900, a large number of Neotropical diplopods were described by Signor F. Silvestri, chiefly in a series of short papers appearing in the *Bollettino dei Musei di Zoologia ed Anatomia comparata della Reale Universita di Torino* (hereinafter cited as *Boll. Mus. Torino*). Although most of his colleagues and successors largely ignored or discredited Silvestri's work, it is undeniable that his illustrations were usually very good, and his descriptions succinct, though brief.

The recent acquisition of one of the early Silvestri papers reveals that in certain milliped groups a great deal of confusion exists which may be attributed to faulty treatment of his genera and species by certain prominent workers. The genus *Camptomorpha* affords one such instance. In the most recent manual of the polydesmoid forms (Das Tierreich, 69, 1938), Attems has associated the name with an entirely different group of millipeds from that to which Silvestri originally gave it, drawing his concept of the genus from the erroneously placed species! In addition, the true *Camptomorpha* has acquired two synonyms, and its species are widely scattered through the pages of the Attems work cited above.

The purpose of the present paper is to demonstrate the nature of the type species of the genus (as readily observable from the original description); to define the genus on the basis of gonopod characters, and bring together for the first time the species properly referable to it; and to summarize the nomenclatorial history of the group.

Genus **Camptomorpha** Silvestri

Camptomorpha Silvestri, 1897, Boll. Mus. Torino, vol. 12, nr. 305, p. 10 (type, *C. dorsalis* Silvestri).
Phantasmodesmus Verhoeff, 1927, *in:* Bronn, Klass. u. Ordn. des Tierreichs, vol. 5, pt. 2, no. 2, p. 509 (type, *Leptodesmus pulvillatus* Attems).
Eucampesmus Chamberlin, 1941, Bull. Amer. Mus. Nat. Hist., vol. 78, p. 489 (type, *E. oreites* Chamberlin).
Leptodesmus subg. *Leptodesmus* Attems, 1938, Das Terreich, lief. 69, pp. 12, 13 (in part).
Leptodesmus subg. *Pseudoleptodesmus* Attems, 1938, Das Tierreich, lief. 69, p. 39 (in part).

Diagnosis. Chelodesmoid diplopods characterized particularly by the shape of the male gonopod. The telopodite is composed of three distinct elements: two large laminate prefemoral processes of nearly equal size, and a much smaller, simple, sickle-shaped solenomerite located between them. This arrangement is unique in the family.

Dorsum smooth; lateral carinae small, their margins generally even, the pores in a swelling near the posterior corner; tibial projections present. Medium sized species (30–40 mm in length).

Distribution. Eastern Cordilleran region in Ecuador, Peru, and western Brasil. One species also from eastern Brasil (Para).

Synonymy. This genus was proposed for the reception of two Ecuadoran species, *dorsalis* and *perproxima,* similar to each other and differing from other forms known to Silvestri in the nature of the male gonopods. These appendages were figured in five drawings, showing them (1) in situ, their coxae attached, and (2) individually, with one of the prefemoral processes removed to show the ordinarily nearly concealed solenomerite. On seeing these drawings, my immediate reaction was that a species of "Phantasmodesmus" was represented. Consultation of the legend showed that the milliped in question was the type species of *Camptomorpha!* I have prepared a copy of Silvestri's figure 29, here reproduced as a line drawing (fig. 1). Comparison of it with the figures illustrating the species listed

below will show beyond doubt they are all species of *Camptomorpha.*

Apparently unaware of Silvestri's paper, Verhoeff proposed the name *Phantasmodesmus* in 1927 for *Leptodesmus pulvillatus* Attems, an upper Amazonian species which Verhoeff correctly felt was not congeneric with the type species of *Leptodesmus.* Until acquiring the Silvestri paper, I had been using Verhoeff's name for this genus.

In 1938, the entire group of "leptodesmoid" millipeds was treated by Attems in a most useful (although somewhat unreliable) compilation. In this work, Attems included a great diversity of unrelated species in the genus *Leptodesmus,* which was divided into four subgenera. This division, based upon the shape of the gonopod coxa, and the presence or absence of coxal spurs, is unquestionably one of the most artificial and indefensible arrangements ever proposed in diplopod systematics. It has already been refuted by Schubart, who has rearranged the members of the group into sections based upon the general appearance of the entire appendage. Attems had placed *pulvillatus* and *papillosus* in the subgenus *Leptodesmus,* and *cordilleranus* in *Pseudoleptodesmus.* His account of *Camptomorpha* on pages 69–74 is incorrect inasmuch as his concept of the genus was based upon species which are not congeneric with *dorsalis.* These five species, not even homogeneous within themselves, will have to be reallocated in the future.

Most recently, Chamberlin has proposed a new generic name—*Eucampesmus*—for a species from northeastern Peru which is obviously only a form of *Camptomorpha.*.

Since only a few of the known species have had the gonopods illustrated from the same aspect, it is difficult to make accurate comparisons or to prepare a key for their discrimination at this time. It may be commented in passing, however, that *cordilleranus* appears only to be a synonym of *dorsalis,* a relationship which can be verified by a re-examination of the type specimen of the latter. Two subgeneric groups may be distinguished by the gonopod structure. In one, including *dorsalis, perproxima, papillosus,* and *cordilleranus,* the prefemoral processes are simply

laminate with uninterrupted margins; in the second, which numbers *pulvillatus, oreites,* and *digitatus,* the prefemoral processes are armed with a variable number of slender branches or spurs. It may become useful at some future time to revive the name *Phantasmodesmus* for this ensemble (the species of which are further distinct in their lowland habitat is contrasted with the strictly Andine *heimat* of the other four) but for the time being there seems to be no particular need for such action.

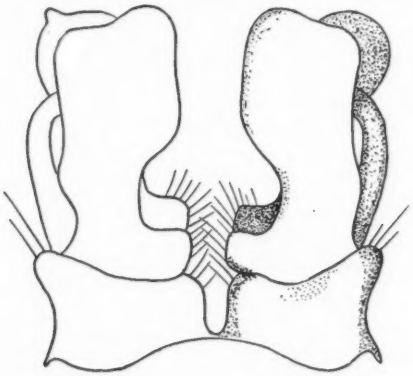

FIG. 1. *Camptomorpha dorsalis* Silvestri. Male gonopods as seen in situ, redrawn from fig. 29 of the paper cited in the text.

Following is a list of the species of *Camptomorpha,* arranged chronologically in order of the date of their description:

C. dorsalis Silvestri, 1897, Boll. Mus. Torino, vol. 12, no. 305, p. 10, figs. 29–31. Ecuador: San Jose.
C. perproxima Silvestri, 1897, Boll. Mus. Torino, vol. 12, no. 305, p. 11, figs. 32, 33. Ecuador: Valle del Zamorra.
C. pulvillatus (Attems), 1898, Denks. Akad. Wien, vol. 67, p. 391, figs. 132, 133. Brasil: State of Amazonas, Sao Paulo de Olivenza.
C. papillosus (Attems), 1931, Zoologica (Stuttgart), vol. 30, lief. 3–4, p. 10, figs. 1–4. Ecuador: Sabanilla, on the east slope of the Cordilleras.
C. cordilleranus (Attems), 1931, Zoologica (Stuttgart), vol.

30, lief. 3–4, p. 28, figs. 40–42. Ecuador: Sabanilla, on the east slope of the Cordilleras.

C. oreites (Chamberlin), 1941, Bull. Amer. Mus. Nat. Hist., vol. 78, p. 489, figs. 97–100. Peru: Department of Loreto, Contayo Hills, Rio Tapiche.

C. digitatus (Schubart), 1947, Bol. Mus. Nac. (Brasil), Zool., no. 82, p. 43, figs. 42, 43. Brasil: State of Para, Aura.

Finally, a species described as *Pseudoleptodesmus tricuspis* by Attems in 1931 (Zool., vol. 30, p. 27) appears to be closely related to *Camptomorpha,* and might well be referred to this group. In *tricuspis* the prefemoral processes are long and slender, and the inner one bears a short upright spur at its base.

A Note on a Subgeneric Name in the Saturniidae (Lepidoptera)

By CHARLES D. MICHENER, University of Kansas, Lawrence

In two recent papers (Michener, 1949, New genera and subgenera of Saturniidae, *Jour. Kansas Ent. Soc.,* vol. 22, pp. 142–147; and 1952, The Saturniidae (Lepidoptera) of the Western Hemisphere—morphology, phylogeny, and classification, *Bull. Amer. Mus. Nat. Hist.,* vol. 98, pp. 335–502) *lapsus calami* appear in the citation of the type species of *Ceratesa* Michener, 1949, a subgenus of the citheroniine genus *Adelowalkeria* Travassos. A letter was omitted from the spelling of the specific name, and it was credited to the wrong author. In order to correct the matter formally the following revision is presented:

Ceratesa Michener

Type species: *Adelocephala hemirhodia* Rothschild.

This subgenus differs from its relatives by the strong apical spine present on each fore and middle tibia as well as by numerous other characters as detailed in the 1949 and 1952 papers cited above.

Samuel Nicholson Rhoads

Samuel Nicholson Rhoads died on Saturday, December 27, 1952, in Camden County Hospital, Lakeland, New Jersey. He had been an invalid for the past twenty-five years and until recently was a patient in a private hospital at Willow Grove, Pennsylvania.

He was born in Philadelphia on April 30, 1862, and became a member of the Academy of Natural Sciences of Philadelphia in 1891, a life member in 1941. His interests were chiefly in birds and mammals on which he published from 1892 to 1902. Perhaps his best known work is "The Mammals of Pennsylvania and New Jersey. A biographic and descriptive account of the furred animals of land and sea, both living and extinct, known to have existed in these States. Privately published, Philadelphia, 1903."

He made collections of other groups of animals. In 1899 he was in Mexico; the Odonata which he obtained there were brought by Mr. F. D. Godman, of London, for the Biologia Centrali-Americana. Among them was a species described in the Neuroptera volume of that series as *Argia rhoadsi.* The Orthoptera collected by him in Mexico were secured by J. A. G. Rehn, who described from that series *Sinaloa brevispinis* and *Pristoceuthophilus rhoadsi;* this Orthoptera material is now in the collection of the Philadelphia Academy. The Academy has also Odonata from New Jersey, Philadelphia County, Delaware and Ecuador gathered by Rhoads in 1899, 1903 and 1911.

From 1902 on for twenty years or so Rhoads maintained the "Franklin Book Shop," most of that time at 920 Walnut Street, Philadelphia, where he dealt in volumes chiefly of natural history character.

(We are indebted to an obituary in the *Philadelphia Inquirer* of December 31, 1952, for some personal data on Mr. Rhoads.)

P. P. C., J. A. G. R.

The Type of Forficula Rehni (Dermaptera)

By JAMES A. G. REHN, *Academy of Natural Sciences of Philadelphia*

In a recent note [1] Dr. Malcolm Burr described as a new species, which he called *Forticula rehni,* the insect which had been recorded as *Forficula rodziankoi* Semenov, from certain localities in Kenya, East Africa, as well as in the lake region of Central Africa. Dr. Burr brought out the fact that true *rodziankoi* Semenov [2] is a very different thing, and that the material recorded as it by himself in 1911,[3] by Borelli in 1915,[4] and by Rehn in 1925 [5] and 1936[6] represents his new *rehni,* which he regards as nearer the palearctic *F. tomis* (Kolenati) than it is to *rodzainkoi,* which was described from Harrar, Abyssinia.

In his description of *rehni* Burr unfortunately failed to indicate a single type for the species, but his sole figure is a photograph of a male specimen from Kijabe, Kenya, collected by Alluaud and Jeannel, reported as *rodziankoi* by Borelli, and now in the collection of the Academy of Natural Sciences of Philadelphia, which acquired it in exchange from the Paris Museum. A photograph of this specimen had been supplied to Dr. Burr by the author for comparison with Anatolian specimens of *F. tomis,* and he used this for comparison with illustrations of topotypic material of *rodziankoi,* and of *tomis* from the Ukraine, the Caucasus and Turkey, and of *F. sjostedti* Burr from Kilimanjaro, East Africa. In consequence, in the absence

[1] Proc. Royal Entom. Soc. London, (B), 21, p. 166, pl. 1, fig. 2, (1952).

[2] Revue Russe d'Entomologie, I, p. 48, (1901). [♂; Harrar, Abyssinia.]

[3] Dermaptera. Wiss. Ergebn. Deutsch. Zent.-Afr. Exped. 1907–1908, III, Zool. 1, p. 459, (1911). [Records from Frangi (location ?), Ishangi, Ninangongo, Kissenji, Bugoie Forest, and foot of west side of and 2,500 meters elevation on Mt. Ruwenzori, Belgian Congo.]

[4] In Alluaud and Jeannel, Voy. Afr. Orientale (1911–1912). Résultats scientifiques. Insectes Orthoptères. I. Dermaptera, p. 14, (1915). [Records from Kijabe, the Kikuyu Escarpment and Wambogo, Kenya.]

[5] Arkiv för Zoologi, 17A, (15), p. 2, (1925). [Records from Kijabe and Kikuyu Escarpment, Kenya.]

[6] Proc. Acad. Nat. Sci. Phila., 88, p. 514, figs. 4 and 5, (1936). [Records from Kijabe and Kikuyu Escarpment, Kenya.]

of other indication, the figured specimen becomes the holotype of *Forficula rehni* Burr (Academy of Natural Sciences of Philadelphia, type no. 5772).

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

General—Busvine, J. R.—Forms of insecticide-resistance in houseflies and body lice. [98] 171: 118–19. **Costa Lima, A. da.**—Anotações ao 6.º tomo de "Insetos do Brasil." [121] 50: 243–48, 1952. **DeCoursey, J. D.**—A method of clearing the chorion of Aedes sollicitans (Walker) eggs and preliminary observations on their embryonic development. [52] 45: 625–32, ill., 1952. **Dutt, N.**—On the forecasting of epidemic outbreaks of the major insect pests of jute. [155] 5: 71–81, 1952. **Fredeen, F. J. H. and others.**—Mass tagging of black flies (Diptera: Simuliidae) with radiophosphorus. [44] 31: 1–15, ill. **Glynne-Williams, J. and J. Hobart.**—Studies on the crevice fauna of a selected shore in Anglesey. [156] 122: 797–824, ill., 1952. **Gray, H. E.**—Insects observed at sea. [76] 45: 1081, 1952. **Gurney, A. B.**—Approved additions to Common Name List, and one proposed change. [76] 45: 1114, 1952. **Hambleton, E. J.**—Entomology in the point four program. [76] 45: 1103–08, 1952. **Hartzell, A.**—Bioassay of organic insecticides in processed foods. [76] 45: 1102, 1952. **Hustich, I.**—The recent cli-

matic fluctuations in Finland and its consequences. A symposium (insects, pp. 60–68). Fennia v. 75. Geographical Soc. of Finland, Helsinki, 1952, 128 pp. (Review by D. S. Farner [52] 45: 542). **Illies, J.**—Weisst du Wieviel . . . ? Eine Betrachtung über Zahl und Arten der Tiere. [Kosmos] 49: 87–90, ill. **Jones, G. D. G. and W. D. E. Thomas.**—Contamination of nectar with the systematic insecticide "Schradan." (Honey bees.) [98] 171: 263. **Kaisila, J.**—Insects from arctic mountain snows. [Suomen. Hyönteist. Aikak. (Ann. Ent. Fenn.)] 18: 8–24, ill., 1952. **Kempthorne, O.**—The design and analysis of experiments. N. Y., Wiley; London, Chapman & Hall, 1952. 631 pp. $8.50. (Review by F. M. Wadley [52] 45: 612.) **Knipe, F. W. and H. Frings.**—An improved cage for flies. [76] 45: 1099, 1952. **Knowlton, G. F. and E. H. Kardos.**—Celery field insects of Utah. (Abstract.) [Proc. Utah Acad. Sci.] 28: 116, 1952. **Knowlton, G. F. and G. P. Taylor.**—Utah insects—occurrence and notes. (Abstract.) [Proc. Utah Acad. Sci.] 29: 49–50, 1952. **Kurtz, O. L., N. A. Carson and H. C. Van Dame.**—Identification of cereal insects in stored grain by their mandible characteristics. [Journ. Assoc. Off. Agr. Chemists] 35: 817–26, ill., 1952. **Legay, J.-M.**—Sur une méthode d'étude quantitative de la prise de nourriture chez le ver à soie. (Lepid.) [2] 236: 326–28. **Martorell, L. F. and J. Adsuar.**—Insects associated with papaya virus diseases in the Antilles and Florida. [J. Agr. Univ. Puerto Rico] 36: 319–29, 1952. **Nordman, A.**—Insekternas uppträdande under den i klimatologiskt hänseende avvikande sommaren 1951. [103] 32: 158–64, 1952. **Osborn, H.**—A brief history of entomology. Spahr and Glenn Co., Columbus, Ohio, 1952. 303 pp., 58 pls. of portraits. $4.50. (Review by M. T. J. [52] 45: 604.) **Rees, D. M. and J. V. Smith.**—Preliminary report on the control of the biting gnat in north Salt Lake City, Utah. (Abstract.) [Proc. Utah Acad. Sci.] 27: 63. **Roth, A. R. and R. A. Hoffman.**—A new method of tagging insects with P^{32}. [76] 45: 1091, 1952. **Schatz, L.**—The development and differentiation of arthropod procuticle: staining. [53] 45: 678–86, ill., 1952. **Smith, K. D. and G. B. Popov.**—On birds attacking desert locust swarms in Eritrea. [58] 86: 3–7. **Southgate, B. J.**—A convenient method for degreasing insect specimens. [58] 86: 10. **Tucker, R. W. E.**—The insects of Barbados. [J. Agr. Univ. Puerto Rico] 36: 330–63, 1952. **Vappula, N. A.**—Finnish entomological literature

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Reviews

THE GRASSHOPPERS AND LOCUSTS (ACRIDOIDEA) OF AUSTRALIA. Volume I, Families Tetrigidae and Eumastacidae. By James A. G. Rehn. 326 pp., 21 pls. (287 figs.) Commonwealth Scientific and Industrial Research Organization, Australia. Melborne, Oct. 28, 1952.

Near the close of World War II officials of the Commonwealth Scientific and Industrial Research Organization, of Australia, requested J. A. G. Rehn, of the Academy of Natural Sciences of Philadelphia, to undertake a monographic study of the grasshoppers of that continent. For some years workers dealing with the ecology, behavior, and control of Australian species had been handicapped by the lack of names for a large number of undescribed species, also by several fundamental shortcomings in the taxonomic work of Yngve Sjöstedt, the late Swedish orthopterist who had published more extensively than anyone else on Australian Acridoidea. A very close and helpful cooperative arrangement was made with Mr. Rehn, by which partially sorted series of genera were sent to Philadelphia in several lots, to minimize the risk of loss in shipment and to reduce the routine handling of specimens by Mr. Rehn. At the same time full geographic and other pertinent notes were supplied. For the development of this cooperation and the incentive leading to this highly successful undertaking much credit is due K. H. L. Key, a Senior Research Officer (CSIRO) in Canberra.

The present volume covers the Tetrigidae (grouse or pygmy locusts) and Eumastacidae (monkey grasshoppers, which in the United States are represented by only a few southwestern species). In Australia 37 species and subspecies of the former are

known, and 43 of the latter. Four genera and 19 species and subspecies are described as new in the Tetrigidae, two genera and 24 species and subspecies in the Eumastacidae. Of the 43 new forms the holotypes of 25 are deposited at Canberra, four each at Adelaide and Sydney, nine at Cambridge, Mass., and one at Washington, D. C. Of the total of 80 species and subspecies treated, some 16 tetrigids and 19 eumastacids are now recorded in North American collections. The 37 previously known forms (not including synonyms) were described by Sjöstedt (25), Ignacio Bolivar (6), Walker (3), Erichson (2), and Stal (1).

This book is attractive, but the binding is not especially sturdy. In Mr. Rehn's habitual style, which has become a tradition for completeness of detail in orthopterological work, careful attention is given to the location of places, the distributional pattern of the major entities both within and outside of Australia, and full descriptions of higher categories, genera and species. Photographs or drawings represent all but two of the 37 tetrigids and all but 13 of the 43 eumastacids. There is an index to the systematic categories treated. A total of 424 footnotes are used to separate certain references and many very interesting and valuable details from the more formal systematic text. Some readers may wonder if the number of footnotes might not have been somewhat reduced without loss of detail. In the case of *Moraba improcera,* for instance, the original description has four different footnotes pointing out that the holotype has been dried from a wet preservative and that consequently there has been shriveling and an uncertain amount of change in color and shape.

While this work will naturally become a standard wherever Australian grasshoppers are studied, and the concentration of types is mainly in Australia where they will give an added impetus to research by resident students, American orthoperists concerned with the world fauna will have a much improved reference series available as a result of Mr. Rehn's comprehensive studies. The specimens collected in Australia by P. J. Darlington in the early 1930's, and now located at the Museum of Comparative Zoology in Cambridge, have proved especially helpful. It may interest Americans that one eumastacid, *Callitala lesueuri,* is named for Charles A. Lesueur, a member of an early French expedition to Australia who eventually came to America, was an active zoologist in Philadelphia, and later joined Thomas Say in the historic colony at New Harmony, Indiana.

But few improvements could be suggested for this admirable work. Identification keys might be used with greater facility if more references to appropriate illustrations were inserted directly in the couplets. The lack of opportunity to consult the historic Sjöstedt material at Stockholm necessarily has been responsible for incomplete information on certain species, but Mr. Rehn has assured me that this handicap was not serious and that most of Sjöstedt's species are recognizable without reference to the Stockholm types.

A manuscript on the Pyrgomorphinae has been completed for some months and is expected to constitute Volume 2. At present Mr. Rehn is busy with the Cyrtacanthacridinae (spine-throats) which are the largest single group of grasshoppers in Australia, and which consequently are expected to require two volumes. Treatment of remaining groups will follow, probably in two volumes, and it is hoped that a final volume will bring together much material on distribution and other general aspects, so that about seven volumes are planned. This modern work reflects the author's 50 years of experience with the world fauna as well as the availability of a collection which in many groups of Orthoptera is the finest in existence. For the majority of users who have struggled with previous Australia revisions it has the added advantage of being in English.

One wonders how many taxonomists endowed with much natural ability and high ideals have had their hopes for major taxonomic accomplishment falter and then collapse in the face of advancing age, administrative responsibilities and seemingly endless interruptions. At slightly past 70 years of age, Mr. Rehn may be congratulated for not having allowed himself to lose sight of his goal. We may hope that there is for him a well deserved satisfaction in seeing a successful project reach the publication stage, and also that nothing will prevent the completion of the entire review of Australian grasshoppers.

ASHLEY B. GURNEY

Division of Insect Detection and Identification
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